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CENTRAL INTELLIGENCE AGENCY

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The report contains
a detailed description of irrigation, drainage, and land conservation projects
in the Ukrainian SSR and the Belorussian SSR. It also provides information
on agricultural institutes and experimental stations in these regions.

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SOVIET MARSHLAND PROJECTS AND RESEARCH STATIONS VISITEDCentral Peat Bog Station at KOSINOV

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The institution was founded in 1923, ^{it was} ~~and is~~ divided into three departments:

- (1) Peat reserves and raw materials,
- (2) Utilization of peat for fertilizer, and
- (3) Mechanization of agricultural fertilization

The central station at KOSINOV has the following branches:

1. DIMITROV, 100 kilometers southeast of Moscow
2. VTOROV near VLADIMIR, 200 kilometers from Moscow
3. REDKINOV, 130 kilometers from Moscow

Experimental agricultural fields ^{were} ~~are~~ in DIMITROV. The Vtorov station ^{was} ~~is~~ primarily concerned with mechanization for producing peat for fertilization purposes. A total of 35 scientists ^{were} ~~are~~ employed at the station and its branches.

The degree of disintegration [of the peat] is determined by one method, which consists of spreading the peat mass on paper, and by another method involving the use of microscopes and which was developed by MIKINA. A publication on this method was issued.

At the suggestion of NIKONOV, a peat bog cadastre was started in the RSFSR which has been continued and the results of which are printed.

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The extent of the peat reserves could not be given definitely, since the investigations were not yet finished. However, a map of the European part of the RSFSR was completed and showed the distribution of peat reserves, not within local political boundaries but based on the extent of natural reserves so that the percentage of peat reserves within natural boundaries could be seen. For example, in the forest zone, marsh areas amount to 20 percent of the total area, and the marshland areas decrease toward the south.

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Numerous maps, graphs, etc. were shown which gave a characterization of the peat, the functional relations between the pH number and CaO content in the crumb structure and depth, the agrarian-technical characteristics, etc.

The question of using peat as fertilizer is considered particularly significant in the RSFSR, and work carried out thus far has led to results, [redacted] It should be emphasized, however, that the hope of applying these peat exploitation methods in East Germany is completely false. In the RSFSR, widespread lowland bogs which are only slightly decomposed are being partially and systematically used for fertilizer. These are areas which have never been agriculturally utilized [cultivated]. In East Germany, however, bog lands have, for the most part, been cultivated at one time and are, thus, underlaid by a cultivated or oxidized [layer] which must be maintained to enable further agricultural utilization. This fact must be faced, in view of the present propaganda line urging that the example of the RSFSR be introduced in East Germany.

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[redacted]

[redacted] Peat is removed 5-6 times in one season, and a total of 1,000 tons of fertilizer peat is produced from one hectare. This fertilizer peat is "splashed" on light mineral soil (to a depth of

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2 centimeters, or 40-60 tons per hectare) and on clay soil to a depth dependent on the humus content. The removal of peat for fertilizer continues until a 50-centimeter layer remains. The area in the RSFSR from which peat is removed amounts to 20,000 hectares and is to be increased to 70,000 hectares.

In 3 years, 10,000 hectares of land have been treated with fertilizer peat. The harvest [on this acreage] is said to have increased 200 percent. Experiments with peat compost have increased yields. Peat compost is made with clay, according to a Dutch method. Highland peat is not as suitable for the production of humus fertilizer as lowland peat. The peat fertilizer is worked into the soil to a depth not more than 10 centimeters, and lasts for 7 years. It is thus more lasting and productive than manure fertilizer. The effect of peat fertilization, however, is not as satisfactory if the land has previously undergone repeated, systematic fertilization.

Visit to the Ukrainian SSR [REDACTED]

[REDACTED]

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[REDACTED] Water economy is carried out within a main administration equal in rank to the ministries. At present, a reorganization is in process. This main department is engaged in land improvement and deals with agricultural water supply. Dam construction falls within the jurisdiction of the pertinent ministry -- in many cases, the Ministry for Electric Power Supply. Drainage and irrigation projects in the Kiev district were toured under the leadership of ROTAN.

[REDACTED] the TRUBESCH and SUPOI drainage and irrigation projects were visited. TRUBESCH is a 32,000-hectare area, 70 percent of which is peat bog extending to a depth of 4-7 meters. Stratigraphically, it is

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lowland bog (Phragmites plus Carex) with a transition bog character (Hypnum). The drainage project was started in 1955, and is to be completed by 1960. [Detailed ditch measurements are given.] There is no pipe drainage. The average depth of the drainage [ditch?] is 70-75 centimeters with a 250-millimeter diameter. The main channel is 124 kilometers long ([carries] 20 cubic meters per second). The settling of the bog is measured according to a formula by PANADIADI. Depending on the settling, [which takes place over a period of] about 10 years, drainage channels, which have a life-span of about 4-6 years, are renewed and reduced to a 5-meter distance apart, depending on conditions. This irrigation system also serves drainage purposes. In the spring, thorough drainage is carried out and then during the growing period the ditches are closed off and prevented from emptying into the main channel. Wooden dams from older [drainage] systems have now been replaced by concrete dams, the parts for which are produced in a central construction yard (BERIESAN) and are delivered in pre-fabricated form to the construction sites. Where such dams are not available, other more primitive, but equally effective means are used. Crop rotation in the drained area is as follows: grassland (3-4 years), potatoes, beets and corn, vegetables, vetch mixture with new seeding in the fall. Yields average as follows: grassland, 7,000-8,000 kilograms per hectare of hay from two cuttings; potatoes, 20,000 kilograms per hectare; beets, 45,000 kilograms per hectare; and vegetables (cabbage), 95,000 kilograms per hectare, with a higher yield from experimental plots.

Nitrogen [fertilizer] is not allotted, phosphoric acid is granted only in individual cases since it is scarce, and about 90 kilograms per hectare of potash is allotted. For potatoes and grassland 500 kilograms of pyrite, an industrial waste product containing copper, is allotted per hectare. The cost of this drainage system is 2,200 rubles per hectare; and 6 percent of the work is done by the k⁹/lkhoses.

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Visit to the PANFILA Peat Bog Experimental Station in the Region of

SUPOI

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The function of this station consists of research on drainage and cultivation measures followed by agricultural utilization.

The station is about 101 kilometers southeast of KIEV in the 22,000-hectare SUPOI drainage area. The station consists of 140 hectares of marshy soil. It is, stratigraphically, also a lowland peat bog with a transition bog character. The station employs ten scientific specialists.

The area has been under drainage since 1937. At present, general repairs, such as ditch deepening, are being started. In general there are no ditch bed foundations which would enable the use of machinery. All ditches have been dug with excavators. The SUPOI [River] is the main channel with a 1% slope and a drainage fall of 0.3%. At present, two reservoirs are being built for holding back water in the upper regions of the Supoi.

The drainage measures are an attempt to accelerate the decomposition of the peat for agricultural use. "Aerobe" [Aeration?] processes have thus had to be introduced, which could also be used in East Germany. Professor TUELENOV has developed a type of drainage excavation machine, called an "aeration" or "coordination machine" which can be used both for drainage and irrigation. Aeration is created by means of channels dug 40 centimeters below the surface. Through the use of this machine, it was shown that 3 tons of nitrogen is activated per hectare, and the spring growing period can be lengthened by 2-3 weeks.

The ground water level at the experimental station area is 50-75 centimeters underground at present. Although no P_2O_5 fertilization has been undertaken, the grassland stands presented a very good and uniform appearance. The following crop rotation is carried out in the TRUESCH area: potatoes, beets, forage crops (corn, vetch, Sudan grass, millet), oat-vetch mixture, and grassland (3-4 years).

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Various seed mixtures are used in grassland seeding, and about 20-22 kilograms are sown per hectare. Production of grass seed is also carried on. Stands are used for hay production the first year, and for seed production the second year. The average yearly temperature is 7.2 degrees [Centigrade] and the annual precipitation is 400-450 millimeters, of which 130-200 millimeters of rainfall is recorded for the June/July growing period. [Sample of a seeding mixture is given] Seed yields produced from Timothy and Fescue grass amount to 300-400 kilograms per hectare.

Visit to the SUYEP Drainage Area (12 May 1957)

The SUYEP area is 10,000 hectares in size, of which 8,500 hectares are agriculturally utilized. It is administered from the DANIDAV (Pump Station). The peat bog covers 6,500 hectares. It consists of Hypnum-Phragmite-Equisitum peat varying in depth from 20 centimeters to 4 meters. The area has been in use for 10 years and at present is being reconstructed. The wooden structures (particularly dams) are now being replaced by reinforced concrete. Drainage is coupled here with irrigation of mineral soil in highland areas. It is irrigated by means of bucket elevators with a sprinkling system. Two pumps were seen which drain 500 cubic meters [of water] per hour. There is one central administration and three branch offices for the area. A total of 17.5 million cubic meters of water is stored in two reservoirs; 3.5 million cubic meters in GORNIRAKAYA and 14 million cubic meters in LESNOYE. Pipe drainage is not used, because it is too expensive for peat bogs. Crop rotation is carried out in both peat bog and mineral soil. Irrigated corn crops yield 5,000 kilograms of kernel corn (Koerner ~~maize~~) per hectare.

Planning Institute KIEV

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PERECHREST, Director of the Planning Institute, outlined its work in the presence of leading staff members. The institute headquarters

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are in KIEV: and its three branches are located in ODENAR, VOVOLEV, and SAPORODNY. Some 1,200 engineers are employed at the institute. The institute is concerned with the planning and drainage of marsh areas and irrigation of the southern part of the Ukraine in the forest steppes and steppe zone.

Within the framework of the drainage and irrigation measures, dams and water storage facilities (including water containers for the fishing industry) are planned. The institute also carries out planning in agricultural water supply, the diking of rivers, and road building. According to plans, construction measures will be carried out by a construction organization. The chief engineer, who is responsible for planning, also supervises the execution of construction. There are also special industrial enterprises responsible for repairs. The actual execution of large construction measures takes priority over housing construction for workers. The annual work plan is set up within the framework of the Five-Year Plan.

The Institute is divided into the following departments:

1. Housing and industrial construction
2. Topography
3. Hydrotechnology and geology
4. Agrarian economic department (utilization of improved land areas)
5. Water supply
6. Financing
7. Hydrology
8. Soil research (including laboratories)
9. Electrotechnology
10. Equipment (including personnel department)
11. Scientific research work (including documentation)

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In addition, there is a duplicating department.

The number of chief engineers employed depends on the number of projects being processed. Projects valued at more than 50 million rubles must be endorsed in Moscow, while projects valued at less than 50 million rubles are endorsed by the Council of Ministers of the Ukrainian SSR after the project has been examined and approved by the Main Department for Water Economy of the Council of Ministers. Smaller projects involving less than 500 hectares are approved in the area concerned. Planning work proved particularly interesting and would be worthy of imitating in East Germany [Detailed preliminary planning work is described]. After such preliminary work has been completed, the actual project is set up. Depending on the difficulty, the project is set up in two or three stages. Preliminary work, including the soil and hydrological research, such as ground water observations, climate conditions, take at least 1-2 years according to the size of the project. Such thorough planning is often lacking in East Germany. The kolkhoz concerned must give its approval of the project before construction is carried out.

Costs of setting up a project amounted to about 2-5 percent of the total construction costs. Costs for the project are essentially paid by the State, and only funds for smaller items, such as pond construction for the kolkhoz, are paid by the kolkhoz. The maintenance or "exploitation" costs are also granted by the state. Smaller secondary canals are maintained by the kolkhoz, and the kolkhoz also pays for subsequent agricultural measures, such as plowing, new seeding, etc. In 1956, 28 million rubles were granted by the state for [such] projects, and one million rubles was collected from kolkhoses.

Erosion, which is very widespread in the Ukraine, is being energetically fought through the planting of wind breaks. The eroded areas (so-called "Balli") are completely planted.

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The irrigation project in the KHERSON area

covers a total area of 60,000 hectares and cost 340 million rubles; 10,000 hectares have been completed [irrigated] up to now.

A total of 4,000 kilometers of irrigation ditches have been dug as part of the Crimean irrigation project. The total area covers 1.5 million hectares, of which 80,000 hectares have now been improved. It is planned that the DNYEPR River will provide 350 cubic meters of water per second for irrigation; it now supplies 68 cubic meters per second.

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The director of the institute said that working conditions at the institute were unfavorable and crowded, but were to be improved. Of primary importance, however, is housing construction for employees which is now being carried out.

Botanical Institute in KIEV

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Professor SEROV, director, outlined the work of the institute which has existed in its present form since 1931, is under the Academy of Agricultural Sciences, USSR, and is divided into the following departments: morphology and higher plant systems; lower plant systems (alga and lichen); microbe plants; geo-botany; embryology and cytology; and physiology.

The large number of publications issued by this and the other institutes is particularly noticeable. For example, a ten-volume compilation on the flora in the Ukraine is being published, seven volumes of which have already appeared; about 5,000 higher plants are described. The total plant collection at the institute comprises about 400,000 pages. Additional material has been published on alga, mosses and mushrooms, plant types, bread grain varieties, and the history of higher plant embryology.

Ukrainian marshlands and the planting of protective hedgerows were discussed from a geo-botanical viewpoint. A new work on Ukrainian

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marshlands, including mineral content of the soil, by Frau Professor BRADIS, will be sent to delegation members when it is published. Ukrainian peat is about 80-percent eutrophic in character, mixed with mesotrophic features. The peat-impoverished marshlands typical of northwest Germany is not found in the Ukraine. The marsh and peat are divided into the following main types: oligotrophic, eutrophic (80 percent), and alkalitrophic (carbonate).

Geographically, the Ukrainian marshes are dominantly eutrophic in the POLESSYE area. In the northern forest steppe area, alkalitrophic marshland predominates. In the actual steppe area of the southern Ukraine, marshland is found in the Dnyepyr and Donets steppe district. Peat is produced from this land, but since about 1930, successful systematic agricultural utilization of the land has taken place.

Peat is removed until the mineral base is reached and then fish ponds, if anything, are built.

Ministry of Land Improvement, MINSK (14 and 15 May 1957)

The ministry is divided into the

1. Investment Department
2. Department for Mechanization and Land Improvement Machine Station
3. Utilization of the Drainage Systems

Maintenance of the systems is administered by the land improvement departments in the areas. Construction of drainage systems is done by the land improvement machine stations.

4. Technical Control Department
5. Planning and Finance Department (sets up Five-Year Plans and long-range plans up to 15-20 years)
6. Material Supply and Accounting Department

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Plans for projects up to 300,000 rubles in value are endorsed by the area administration; projects valued at less than 10 million rubles are endorsed by the Ministry for Land Improvement; those valued at less than 30 million rubles are endorsed by the Council of Ministers of the Belorussian SSR, and those valued at over 50 million rubles are endorsed by Moscow. The setting up of projects is discussed in the Ministry of Land Improvement, and project planning is undertaken by an institute under the Ministry, where planning is done by:

1. A research department, which carries out examinations in the area, including topographical surveying. A classification of the soil structure is divided as follows podsolic forest soil, marsh soils, and alluvial soil. Depending on the type of water inflow, various bog types have been established: in northern USSR, peat bogs with atmospheric precipitation, and in southern USSR, with an underground water supply. Several institutes participate in the preliminary work on a project, which may last 2 to 5 years.

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2. A planning department, which sets up the actual projects; there is a chief engineer for each project planning group.

3. A technical department concerned with planning, accounting, etc.

4. An accounting department.

A land improvement department, consisting of 5-7 engineers, exists in each area, and there is a chief land improvement officer (Obermeliorator) in each ~~county~~ ^{raion} (Kreis) who completes smaller projects in cooperation with the kolkhoses. In addition to the land improvement machine stations, there is a hydrotechnical engineer in each MTS, as well as in the land improvement machine stations, who is concerned with the agricultural water supply.

Total land to be improved in the Belorussian SSR amounts to 4.5 million hectares of marshy soil and 2.5 million hectares of partly peat

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and partly mineral soil. This represents 21 percent of the agriculturally usable land. The PRIPJET River has a flow of 300 cubic meters of water per second, and flooding takes place over an area up to 40 kilometers wide.

Highland marshes are used for cultivation, as well as for fuel peat removal, and for wood production if the area is no more than 50-percent forested. The areas are drained, and the process is referred to as "forest land improvement." There are five different forest formations.

Marshland Experimental Station in MINSK

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This station was founded in 1912 and is now a branch of the Institute for Land Improvement and Water Economy in MINSK. The total area covers 150 hectares, of which 120 hectares are marshland. Drainage was in process from 1912 to 1926.

It was noted at the Minsk station that high yields are also attained in areas where ground water level is low. A pump station which supplies water to MINSK has lowered the ground water level in part of the area to 3.5 meters below ground, while the rest of the area has a ground water level of 0.5-1.5 meters below ground.

The depth of the peat varies between 0.7 and 1.2 meters and is underlaid with loam or medium-to-coarse sand. Crop rotation is as follows: 4-year grassland, and 5 years of planting with one-year crops, such as winter grain, summer grain (including wheat), potatoes, and industrial crops. A large number of experiments are carried out, particularly, tests as to the cultivation potential and background of individual agricultural crops. Results of experiments are given in the literature brought back by the delegation.

Regardless of the ground water level, the following yields are attained, (in kilograms per hectare): potatoes, 30,000-45,000; forage

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beets, 62,500; sugar beets, 37,000; carrots, 40,000-100,000; winter rye, 3,000-3,500; summer rye, 3,000-3,500; summer wheat, 2,500-3,500; and two cuttings of hay, 1,300. The following fertilizer amounts were given, (in kilograms per hectare): potash, 120-180; P_2O_5 , 60-90; and pyrite (with a 0.1-0.4-percent copper content) 500 every 5 years. In addition, the soil is injected with bacteria.

In grassland seeding (with a nurse crop of oats and ⁴rye), a 20-22-kilogram mixture is used per hectare, with timothy predominating. Planting is carried out as early as possible. Seeding done one day later than 25 April can reduce yields by 30-100 kilograms per hectare. Red and white cattle are maintained, and milk production averages 4,450 kilograms per cow per year.

The ORESSA and BWO Kolkhoz Drainage Area

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The ORESSA area lies in the Pripyat Swamps about 150 kilometers south of MINSK. The Oressa River empties into the PTITSH River, which, in turn, empties into the PRIPYAT River. The emptying of the Pripyat into the DNYEPR cannot be regulated. In the years 1929-1932 the Oressa River, between LYUBAN and URETSH, was regulated, and reclamation of the marsh area was started. Now, particularly in 1958, repairs are necessary; all canals must be deepened as a result of settling, and drainage, particularly mole drainage, is planned for 1958. There are 48,000 hectares of drained marshland [in the ⁹Rayon?].

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the lack of canal foundations, and erosion was noted near Lyuban where the Oressa River was regulated but had no foundation [structure]. Bucket elevators are not in existence, since there are no sources of energy. Mole drainage has proven successful, and wooden drainage has lasted for about 30 years. The first experiments in the drainage area were made by the Academy about 100 years ago. A new work on bog settling by the Pole

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OSTROMENSKI is available. Weak kolkhoses can receive a state subsidy for 50-percent of the cost of building side canals and drainage channels. Per-hectare building costs for drainage and canals amount to 2,500-3,500 rubles and to 800-1,500 rubles, excluding drainage. In general, costs are not as high as they are in the Ukraine, since reinforced concrete is not used to such an extent.

The Bw_o Kolkhoz lies in the Oressa drainage area. It was founded by soldiers in 1930 when the first reclamation work was started. At present, the kolkhoz covers about 11,000 hectares or seven villages, of which 7,000 hectares are marshland; 4,600 hectares of marshland and 600 hectares of sandy soil is being agriculturally utilized. Crop rotation is as follows: grassland planting (4-6 years), potatoes, summer grain, and hemp, the latter ^{being} one of the chief sources of income for the kolkhoz which operates a hemp processing plant and also a brickworks. An electric power plant is operated on the basis of refuse from the hemp plant. Hay yields average 6,000-7,000 kilograms per hectare; summer rye, 29,800 kilograms per hectare; winter rye 3,500-4,000 kilograms per hectare; and hemp yields, 1,400 kilograms per hectare; potatoes, 20,000-22,000 kilograms per hectare; and milk yields per cow, 4,200 liters per year. The following amounts of fertilizer are allotted (per hectare): 300 kilograms of 40-percent potash; 300 kilograms of 16-percent phosphoric acid; and an additional 80 kilograms of nitrogen fertilizer for hemp and 600-700 kilograms of pyrite fertilizer. Mineral soil is fertilized with 40 tons of peat and manure mixture per hectare. Precipitation averages 630-720 millimeters annually. Income from animal breeding operations is to increase from 3 million rubles [now?] to 11 million rubles by 1960 and income from hemp cultivation is to increase from 21 million to 37 million rubles [by 1960]. Also, 3,000 more hectares of land are to be made arable.

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VOLMAR Experimental Drainage Field (on the Sloust [Sluch?] River)

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Drainage installations here are still being constructed. The following per-hectare crop yields have been attained: 4,200 kilograms of hay; 35,000 kilograms of potatoes; and 2,000 kilograms of oats.

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the square-cluster method of planting potatoes should be used more on uncultivated soil rather than on highly-cultivated soil. In the course of cultivating the Minsk experimental fields, the mineral content of the soil has increased from 6-8 percent in 1920/1924 to 15-18 percent at present. The per-hectare organic mass loss is figured at 600-800 tons. The delegation was given a publication by S. G. SKOROPANOV and M. M. SCHABONINA which deals with agrarian-technical results of meadowland cultivation over a period of several years in peat bog soil.

Institute for Land Improvement and Water Economy in MINSK (17 May 1957)

The Institute was organized in 1930 on the basis of the Minsk Marsh Experimental Station and concerns itself with drainage and marshland utilization. The Institute is divided into 13 departments which consist of two work groups: the engineering group, concerned with water equalization (Wasserbilanz) and methods of water regulation; and the agronomic group concerned with initial cultivation and utilization of land. The Institute employs a total of 138 persons, and has three experimental stations, including the one in Minsk, one in KOSSUVA in the Brest area, and a new one in the POLESSYE area. In addition, four production experimental stations are located in sovchoses and kolkhoses in the VOLMAR, GRESSA, and WINLITSEN marshland area, and in mineral soil in the KARINKA area. The MINSK Institute was well equipped for water research and had

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several pieces of equipment which had been developed at the institute itself. By means of radio-activity, research on water and nutritive material movement was carried on. Highland marshland in the USSR is used only for fuel peat; and because of the largely uncultivated expanses of lower marshland, there has been no need to develop means of cultivating highland marshes; this need does exist in Germany, however.

The report explains work being done by the science candidate, IVITSKI, in figuring drainage flow, the distance and depth of drains, evaporation, drainage norms, etc. [] higher yields depend less on the ground water level than on the small range between the maximum and minimum level, as shown at the MINSK Institute, []

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Visit with PROFESSOR LUPINOVICH, President of the Academy of Agricultural Sciences Belorussian SSR []

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[] the professor explained the newest viewpoint [summarized in the report] on marshland classification, part of which he lectured on at the International Soil Society Conference in Paris. The visit was worthwhile, insofar as it affirmed the marshland utilization attempts being undertaken in [East] Germany and showed the importance [] of continued close contact between East Germany and Soviet scientists in this field, although complete agreement on marshland classification was not reached.

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